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Online Searching and Chemistry Students at Knox

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Most teachers and librarians still assume that any student who performs a literature search by wading through volume after volume of a printed reference work (like *Chemical Abstracts*, for example) comes away from the experience with at least a practical understanding of that tool and of one way of using it in research. An increasing number of us today, however, are discovering that not only equal but, indeed, additional benefits can be obtained when the student has the opportunity to perform a literature search online.

When the Knox College Library, Galesburg, Illinois, added online searching of the Lockheed Dialog and System Development Corporation Orbit databases to its services, we were apprehensive about the possibility of easy access to online services impairing a student's ability and willingness to use printed bibliographies, indexes, find abstracts. Consequently, we devised policies aimed at preventing students from using online services to obtain "instant bibliographies." After a few years of searching experience, however, we must now concede that our fears and restrictive policies were unnecessary. Few students considered sophisticated online searching essential for their course-related research.

On the other hand, we discovered that the use of online searching in courses after exposure to printed research materials enhanced instruction. Indeed, when introduced in a course as a feature of bibliographic instruction, online searching generally afforded us a much greater opportunity for effective instruction in specialized and general bibliographic and research methods than was available when we limited ourselves to instruction in the use of printed reference works alone.

We have been particularly successful in integrating online searching in courses in the chemistry curriculum. (Online searching is essential in geology courses, and we are constantly encouraging members of all of the college's departments to attend system training at the library's expense.) Database searching is introduced to chemistry students in the first term of their junior year in the laboratory section of Physical Chemistry 321, which is required of all chemistry majors. The aim of the instruction is not to teach the search language, but rather to acquaint the student with the concept of database searching and the construction of search concept tables. Earlier in the course the students have used the printed *Chemical Abstracts* as well as its *Index Guide* and the standard chemistry reference works to complete a graded assignment.

Instruction begins in the classroom with an introduction to searching Dialog's *CA Search* databases. Its structure is compared to that of *Chemical Abstracts* and the construction of a search strategy using the Boolean logical operators is explained. Each student receives a handout describing the database and search strategy with a number of examples. At the end of the introduction each student is given a list of search topics from which one must be chosen to construct a search strategy which will be run in the Dialog *Ontap CA Search* practice database. (Good sample topics can be found as problems and examples in *CA Search for Beginners: An*

Introduction to On-line Access to CA Search via the Lockheed Dialog Information Retrieval Service, Columbus, Ohio: Chemical Abstracts Service, 1980.)

In the next few days, the students meet individually with the instructor to discuss the proposed search strategy. Changes are suggested if it appears that the search will not work at all; however, at this time minor faults are overlooked so that they can be worked out interactively at the terminal by the student with the help of the librarian. Each student then makes an appointment with a librarian at a date when both have enough time to run the search and discuss the results. The students frequently make appointments in groups of three or four in order to observe and compare each other's work. If the search fails, the student can change it until it does work. The searcher may also suggest changes. After the search is completed the student submits the final search strategy and the resulting printout to the instructor to be graded on a satisfactory/unsatisfactory basis.

Instruction in database searching continues in the second term in Physical Chemistry 322 (not required of majors). Students in this course must write a term paper on topics chosen by the instructor after a scanning of current professional journals, like the *Journal of the American Chemical Society* and the *Journal of Physical Chemistry*, which are available in the Library. This is done to keep the need for interlibrary loan at a minimum. Each student must construct a search strategy for literature in Dialog's *CA Search* files which cover the last two years. The references retrieved will form the bibliography for the paper. As in the first term, the student makes an appointment to run the search with the librarian who, after reviewing the strategy with the student, initially acts as typist. Again, the student may make any changes until the strategy works. If the search fails, the librarian can offer suggestions to improve the results; on the other hand, the student may also be advised to consult additional reference tools or meet with the instructor for more general assistance.

We have found that most students after completing a search usually take advantage of the time remaining in their appointments with the librarian to inquire how they can obtain all of the materials listed in their printouts. We all generally agree that this moment is most appropriate for an orientation to the reference collection and an introduction to important library resources and services which may be new to the student. In many cases this introduction includes searching the OCLC online union catalog at the public access terminal and the LCS online catalog of the University of Illinois and 16 cooperating libraries, as well as the myriad bibliographic verification tools.

One technique that we have found useful is showing the student the list of the departments journal subscriptions and evaluation tools such as Bill Katz's *Magazines for College Libraries*. Then we suggest a limitation on any search which identifies a large number of titles which can be found in our library — plus two or three other standard titles which are available within the region (*Journal of Chemical Thermodynamics*, *Journal of Colloid and Interface Science*, and *Theoretica Chimica Acta*, say, for physical chemistry). This quite properly focuses the student's attention on our own resources, while at the same time making it possible to initiate intelligent interlibrary loan requests.

More basic instruction, however, has occasionally been required, starting with an explanation of the card catalog and periodical files and how to use them to locate materials in the library. Regardless of a student's specific need, using online searching instead of the printed abstracts to introduce bibliographic searching methods has given us the opportunity to deal effectively with each student on an individual basis from the preliminary research to final touches.

We consider the total cost of online searching in the two courses slight when compared to the instructional results. Searching in Dialog's *Ontap CA Search* (at \$15/connect hour) for the first term of 1980/81 cost \$80 for 24 searches. A particularly bad strategy was allowed to run up a high bill of \$15; the average search cost under \$3.50, however. Searching *CA Search* (at \$70/connect hour) in the second term cost \$321 for 37 searches; the average search cost about \$8.50. This included a number of expensive searches, the highest being \$33. Because of the importance of time for research in a 10-week term and the instructional value of being able to explain each reference as it appeared, all references were printed online. Had we opted for offline printing, costs could have been reduced considerably.

We have concluded that the benefits to students of this instruction in online literature searching are at least three; 1) each student receives more timely and meaningful exposure to chemical bibliography than previously was possible with the printed *Chemical Abstracts*; 2) each receives an introduction to the library's resources and services specifically related to immediate needs; and 3) each is exposed to the librarian and the library in a favorable situation allowing the librarian to be identified both as a resource and as an individual personally concerned with the student's success in the library.

In this last benefit we have found the greatest satisfaction. — *James Bracken, John Calhoun, and Robert Kooser.*